From Out of "The Ashes" Rises

ZXir QLive Alive!

The Timex/Sinclair NorthAmerican User Groups Newsletter

Volume 4 Number 3 **Fall 94**

Chairman Donald S. Lambert Auburn, Indiana

MEMORY MAP

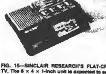

FIG. 15—SINCLAIR RESEARCH'S FLAT-CRT TV. The 6 × 4 × 1-inch unit is expected to sell in the $100 range when it is introduced in 1982.

FIG. 16—FLAT CRT has phosphor coating on rear instead of front. Picture is viewed *through* the tube.

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Volume 4 Number 3 Fall 1994

T/SNUG Information

T/SNUG

Here is the list of T/SNUG Chairmen and how to contact them. We wish to support the following SIGs:- ZX-80/81, TS-1000 SPECTRUM TS-2068 TC 2068 Z88 and QL. If you have any questions about any of these fine machines contact the

Chairman

Chief Motivator
Donald S. Lambert (ISTUG)

Vice-Chairmen

Tape & JLO PD Library
D G Smith
R 415 Stone St.
Johnstown, PA 15906
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Treasurer

Editor & LarKen PD Library
Abed Kahale (CATUG)
335 W Newport Rd.
Hoffman Estates IL 60195-3106

ZXir QLive Alive!

Is the newsletter of T/SNUG, the Timex/Sinclair NorthAmerican User Groups, providing news and software support to the T/S community in a **volume** of four newsletters per year; beginning with the Spring (April) issue.

T/SNUG's main goal is to keep our Magazine, our vendors and our repair service alive for the benefit of T/S users. These valuable services shall have free advertising space in this user supported Newsletter that they can see that we are still active out here. We must support their services whenever possible

Another T/SNUG goal is to unearth titles of all known Public Domain and commercial software available for all Timex/Sinclair machines, building a library and providing lists of that software showing both the source and the availability

We encourage your group to copy this newsletter and distribute it at your regular meetings to all your members If you cannot copy this newsletter, a disk can be provided with the articles for use in your newsletter

If you feel T/SNUG should perform other tasks, let us know your feelings If you have solved a problem in one of your software or hardware, please share it with the rest of us

You can keep T/SNUG alive by an annual contribution of $12 for one **volume** made payable to Abed Kahale. Send check to

ABED KAHALE
335 W NEWPORT RD
HOFFMAN ESTATES IL 60195 3106

Phone - 708 885-4337

Back Newsletter copies are available for 50¢ each postpaid

Article Contributions

Send in your articles by tape or disk and your inputs to -

DON LAMBERT
ZXir QLive ALive! Newsletter
1301 KIBLINGER PL
AUBURN IN 46706-3010

Phone 219 925-1372

Or by hardcopy, mail to:- Abed Kahale. (Address on this page)

GATOR's TWISTED PAIR

!! SINCLAIR !!

We have a 24 hour BBS and encourage you to exchange mail and contribute to the Upload Section. Use it and have fun!! — (8N1 300-2400 BAUD)

Call 708 632-5558

and Register using your first name, last name and phone number along with a password you won't forget, and **Write It Down!** Do not try to do anything else this first time because all the board options will be locked out.

When you call-in the next time, you will have Level 5 security and be able to enjoy full user privileges. The BBS has smaller sections called conferences. Select J for Join a Conference to see the different user groups. Select "TIMEX" to get into the Sinclair Section. The mail you then read will only be from other TIMEX Sinclair users but all SIGs share the same bulletins. Use extension .ART for articles, .ADS for ads and .NWS for news when uploading.

Download articles appearing in this newsletter having ZQA extension.

For help, contact the SYSOP by leaving a message, mail, E mail or phone Bob Swoger, SYSOP --==GATOR==--

(Address & Phone to the left of page)

Input/Output

by Abed Kahale

If you have a question, a problem or a solution, why not send it to us. We will try to find an answer and we will all share it. Mail to

A. Kahele or D. Lambert

(Addresses are on page 2)

Computus Interruptus

It has been long time since I've received any Timex/Sinclair related mail (and since I spent happy hours each weekend chatting with people who called to discuss my articles). That was a fun and interesting time.

I have no problem with your reprinting my work; it's nice to know it's still "living on". Use it in good health.

When you publish the reprints, I'd very much appreciate your sending me a courtesy copy of the issues that contain them. Not only is it nice to see the work reprinted, but I might be able to spot transcription errors (depends on how well my memory works). I do know that the original SINCUS News articles had some transcription errors from my original manuscript.

SINCUS does still exist, though they no longer publish a newsletter. Most of the members are now users of MS-DOS machines, but at least one member continues to accumulate old Timex computers and is still busy working on projects with them.

I never had an opportunity to work with any of the TS-2068 disk interfaces, though I did partially design one, though that was one project I never finished. It was to work with a bank switching unit that added memory banks to the system beyond the three that came built into the 2068, and used the bank switching software that Timex installed in the computer for the Bank Expansion Unit that they never released. I did have that part reasonably well debugged, but our interests change. In any case, are the TS-2068 drive systems difficult to come by these days? What prices do they go for?

I'm not sure which of my articles you have, but I published quite few on building Spectrum Emulator cartridges to make the TS-2068 run Spectrum software from Britain, and on ways to interface Spectrum peripherals to the TS-2068. We spent a lot of time using the Sinclair Interface One and Microdrive with the TS-2068. They were not quite as fast as a disk drive, but there were tons of available software that used the Microdrive, particularly assemblers and compilers, so they were the choice for me. The unfortunate consequence of that was that my path diverged from those who chose the peripherals made specifically for the TS-2068. That's why I asked you about the disk interfaces. It sounds as if you have a lot of experience in some of the things I never had the opportunity to check out.

This may or may not be of interest to you, but are you aware that there are Spectrum Emulator programs that allow other computers to run programs for the Sinclair Spectrum? There are several that run on MS-DOS machines, one for the Amiga, and even one to run on UNIX workstations under X-Windows. The emulator programs are about impossible to find on Bulletin Boards in the US, since there were not a lot of TS-2068/Spectrum Emulator users in the first place, and the people using the emulator programs are mostly former Spectrum users. But in Europe and elsewhere, there are a great number of enthusiasts using these things. If you have or can get access to an INTERNET account, there's a very active USENET discussion going on in the comp.sys.sinclair newsgroup, and there's an FTP site in Slovenia(!!) from which it's possible to FTP literally hundreds of Spectrum games and utilities for use with the emulator programs.

The emulator programs themselves are capable of running even faster than the TS-2068/Spectrum ran, if they are run on a moderately fast machine. I have to tell my emulator to slow itself down, if I'm playing a game and want to be able to keep up when I reach "tough" parts of a game. One of the emulators, written by a fellow in the Netherlands, is shareware, and the registered version actually allows you to build a simple circuit that plugs into the printer port of a PC, which allows your old tapes to be LOADed into the PC from a cassette recorder! His emulation is so good that even the speedloaded programs load without problems. I was pretty tickled to watch it work the first time I tried it. Of course, you can set the emulator to SAVE/LOAD from disk, so the tape interface is just for converting your old tapes.

Well, I didn't mean to babble on like that, but since you're looking for publishable material, I thought you might find that bit of information to be worth a second look. I wish you the best of luck with your publication and am glad to see that the Timex/Sinclair machines are still running strong. Take care.

Wes Brzozowski
Endicott, NY

We thank you for the excellent CI series and we appreciate the information you provided.

Basically, there are two DOS interfaces for the TS-2068, one is ***LarKen*** *that can operate up to four 800K disk drives and a 256K LarKen RAMDISK (SRAM) Spectrum, OS-64(64-column).* ***Dohany's*** *corrected TS-2068 and Spectrum EPROMs can be plugged in the doc board socket.* ***Oliger*** *DOS can operate up to four drives and up to 255 tracks per side and is compatible with the EPROMs. The JLO is still available from The John Oliger Co. I assume that you've heard of the 32-bit Quantum Leap and the Z-88 computers from Sir Clive.*

We do know of Carlos Delhez EMU's they are available from our vendors Editor

Smith's Chart

On my latest issue of ZQA!, there was inscribed "Your last issue" Since I do not wish this to be so, there is attached to this note a renewal check for $12 payable to you Since your organization is the last great hopes I certainly intend to do what I can to keep it alive

One other thing: I am enclosing a couple of tapes which you may not find too usual. They are the programs (also enclosed) for machine construction of the Smith Chart by the 2068. There ought to be a library somewhere for storing such trivia. I don't know whom of your chairmen serves as the librarian for such, so I ask that you route this to the cognizant keeper

This is original enough that I have been granted copyright on the base program, but this is only self-protection for me.

Not many of your readers may be interested in this, but the chart, made into a calculator was much used in my working years as a microwave engineer in components and systems The machine-generated charts are oval (or, more precisely, elliptical), and this is inherent in these machines, so I have gathered from the many books and articles I've read on these computers But the programs are interesting, so I think, in the use of the DRAW command and in the tic-mark generations (not too well spelled out in the available literature)

Application is straightforward, after program insertion, it takes a long time for first results to show on the CRT screen, why? I do not know

Should there not be a collector for documents like this, may I be one of many to suggest such an office? As one whose interest in computers is primarily computation rather than games, I should appreciate your letting me know what comes of this.

Edwin N. Phillips
Orange City, FL

The tape was forwarded to our TS-2068 Librarian, D G Smith and is presented in this issue for those who understand it and appreciate the work that was involved The TS-2068 is slow when it comes to PLOTting from mathematical expressions as in line 2010 I have used similar charts for acoustics that are not as involved as microwaves including reflections standing waves and so on We thank you for sharing the program with us Editor

Did You Know?

That Rod Gowen of RMG has been legally blind for the past five years, now with 20/800 and 20/1000 vision, Retinitus Pigmentosa To perform his work, he uses two closed circuit TV cameras for reading and writing that project the images/characters to a 17" SVGA monitor through a Vista board lots of $$$$ of course The images and characters are magnified up to 60 times with white on a black background to render them readable So please allow enough time for your order and if you have a problem, please get in touch with him Editor

It's Olde English

Why is there a " b " instead of a letter " v " in your masthead.

R Arthur Gindin
Princeton, WV

𝔟 𝔳 *We though that 'Old English' fonts were the appropriate characters to use for Sir Clive computers, albeit some characters are difficult to discern You were not the first to ask this question* Editor

Copyright©

It came up again, so here is the low down

You may not share copyrighted material with others You may change or modify the material (programs) to your heart's desire it is yours You may share or publish any and all modifications that you made that part that you modified, it is your work and effort.

As far as ZQA!© is concerned only the name is copyrighted and not the material inside Editor

SNUG Replies

Paul,
Congratulation on your fine display of integrity and responsibility. I am currently doing Desk Top Publishing

Pete Fischer
Phoenix AZ

Thanks for your efforts Let's close the books.

Derryck Turner
Kirkland WA

Received your postcard re SNUG I had often wondered what had happened. I am unfamiliar with any one of the pubs listed. So, I ask a favor of you. Please choose one for me I am in love with the 2068 and have 5 I've managed to keep 3 working Set me up with the one that devotes the most space to 2068's My regards, and regrets to Paul Holmgren.

Mike Bowers
Pittsburgh PA

I never received any issue of SNUG

Dennis Silvestri

New Haven CT

Sincere thanks for your efforts

Larry Crawford
London ON Canada

Since Glenn has passed away, please send refund to me

Mrs Glenn Ruch
Lehighton PA

Please send me subscription information for ZQA! I would subscribe now but don't have the information.

R Bernett
Ft Meyers FL

Paul advised that I did not receive a complete list of SNUG members. So, I will be mailing PostCards to those who were not on the original list *Editor*

The Bottom Line

We have all read complaints of mail delays between here and CANADA. The complaints have been that the mail between the two countries is like a diode, that is, correspondence travels well in one direction but not back in the other Much of the trouble appears to be the Bottom Line. We here in the USA are told that postal Optical Character Readers machines require all UPPERCASE letters and NO Punctuation. We are also told the bottom line must conform to the format

VILLAGE/CITY STATE ZIP+4 COUNTRY

Country seems to be optional when mailed to a destination in the USA. The US Postal Service tells us that when we send mail to Canada, we are supposed to put in CN for the COUNTRY for the readers to read it properly, but we are told by our local Post Offices to write Canada in the country position as the present postal workers would send CN mail to Connecticut instead of Canada. I believe it!

When receiving correspondence from Canada, we have responded to that correspondence using the return address on the letter head or on the envelope One example was

J C NEWTON
NORTHWEST RIVER
LABRADOR A0P 1M0

Format

■ Capitalize everything, using plain block letters. No matter how legible your handwriting may be, machines have trouble reading script

■ Omit all punctuation in the address, except the hyphen in the ZIP+4 code.

■ Use common abbreviations found in *Publication 65, National Five-Digit ZIP Code and Post Office Directory*, available in post office lobbies.

■ Use the two-letter state abbreviations listed above

■ Use complete and correct ZIP Codes or ZIP+4 codes Contact your local post office for ZIP Code information.

This one was returned to me from a post office in Missouri (MO) I added Canada to the bottom line of a new envelope and never heard a complaint from J C NEWTON again.

At that time, looking at a map at work I could not find Labrador! Just lately, however, I found it in a State Farm Road Atlas under Atlantic Provinces in Newfoundland!, I even found a North West River on that map It seems to refer to a place rather than a 150 mile long river Seems also Northwest should have been two words! So according to USA Postal protocol, my bottom line should have read

LABRADOR NF A0P 1M0 CANADA

The Bottom Line for the Province codes that should be at the second position for the USA Postal readers.

AB ALBERTA	BC BRITISH COLUMBIA
MB MANITOBA	NB NEW BRUNSWICK
NF NEWFOUNDLAND	NS NOVA SCOTIA
ON ONTARIO	PQ QUEBEC
SK SASKATCHEWAN	YT YUKON TERRITORY
PE PRINCE EDWARD ISL.	NT N W TERRITORIES

What is the difference between Jurassic Park and IBM? One is a theme park with mechanical animals and the other is a movie --GATOR---

HELP!

I have enclosed a disk with two LarKen extended BASIC demos on it. These demos show where I am now with respect to the use of the LarKen extended BASIC windows and screen handling functions in the development of data base or any other types of programs What I need is help in converting the LarKen extended BASIC part of the Data Entry routine to MC. The only way I have to convert my Timex BASIC or LarKen extended BASIC programs is the use of the TIMACHINE compiler This compiler properly handles the conversion of Timex BASIC to MC but can not properly convert LarKen extended BASIC to MC. I am satisfied that the pseudo three window display works well enough to proceed to produce a new series of programs to replace my existing older programs which use the standard Timex 32 character per line ROM font, even without the LarKen extended BASIC converted to MC If however there is any chance that sending you these demos could interest some TS-2068 programmer in helping to convert the LarKen extended BASIC lines of the data entry routine of the real three window display to MC, and I then have all three windows available to me for use in my programming, is well worth the effort. If you know of any programmer who can help with this work please get in touch and I will send a copy of the demos Thank you.

ROBERT SHADE
3210 N BROAD ST
PHILADELPHIA PA 19140-5008

FROM THE CHAIRMAN'S DISK

Donald Lambert

Seems this is the time of a lot of breakdown of equipment. I still have not gotten a replacement monitor that I really like for the working computer. I will keep looking for a monitor. Of course I haven't used RGB yet since I need a cord to be made up. That may be the solution with this monitor.

The computer that was zapped is back and I don't know what John Hamner did to it since I received it by UPS yesterday and I finally got a lull in the frantic fix up ordeals in our house so that I could test it. It now works A O.K. like it did before. The only visible change is the addition of a slide switch to switch the Spectrum ROM in and out. That is a relief to get that magnetic switch out of the way. I am now back with a keyboard that has better action than the other computer I was using.

But the Spectrum mode will not work with the LarKen/Oliger interface attached to the computer. I haven't tried it with just one or the other.

The only thing that I saw at the **Dayton Computer-Fest** in the flea market area that was not at a T/S table, was a TS-2068 for $20 and with the vendor's permission I got to take it to my table and test it. In fact I pointed out the monitor that had the Fest greetings running that just could be seen from his table. Also with the computer as a package was a Craig portable cassette recorder of an earlier vintage. That,I haven't tested yet. The whole package included three cassettes, two were of T/S software but the third was a recording of music and some comedy deal from radio I believe. But the entire package was not worn so maybe it had not gotten much use. I don't know how many TS-2068 computers that I now have.

Keith Watson was demoing on his laptop (MSDOS) a TS-2068 emulator which he has almost gotten completely programmed or so I understand.

Bob Swoger was there and he bought some 1/2 height working disk drives (5.25 40-track DSDD) so he may soon be using them in place of his single sided 40-track drives. He and his wife brought along a 14 year old boy , ~~Philip Kwitkowsky~~, who is getting into the T/S computing with a TS-2068 outfitted with a LarKen disk interface. He was a fresh bit of enthusiasm and he has the making of a T/Ser since he scouted out a table that had some full height Tandon TM100-2A drives for $1.50 each and I went over with him to check on the drives. He offered the dealer $1.50 for the three drives he had out. He got the three drives, untested so he and Bob get to do the testing back in Chicago. Pillip Kwitkowski

I have a disk drive power supply plus an interface ribbon cable that I use to test disk drives and I had it along. That makes it so much easier to test drives at the Fest or at meetings. And of course I picked up a bunch of drives, will see what they are like later.

I had a want list, some of the stuff wasn't even seen. I did get a good buy on printer ribbons from the same person that I bought from last year. Don't ask me how but one computer store takes the ribbons (still sealed in plastic bags) out of the new printer boxes of Epson LX810 printers and puts in another kind. At a price of $0.50 each, I bought a dozen. With a usable life of about three months that means about three years of ribbons if they don't dry out in the bag. *(See Price Watch in the Ads section in this issue.)*

My eye operation *(for cataract)* was a success since I can see with that eye but not clearly. However, it is best early in the day since as the day goes by the eye gets tired and since the operated on eye is the dominate eye. But I can see progress in better vision. But 12 weeks before it settles in — that seems ages since this is the fifth day since the eye was unbandaged.

Joan Kealy reported that Radio Shack fixed her Magnavox RGB monitor so it is like new. Cost was about $100 I think - Radio Shack is now in the repair business and not only on their merchandise. I should have taken my monitor to Radio Shack but then I didn't and it is gone.

I went to the Summit City HamFest which is about twenty miles away and I got a Magnavox RGB monitor that looks like what I had go bad on me, except that this one is a "Professional" which is only a difference in the name. Works great and for $35, so I did luck out.

I realize that this is short but I have gotten too long winded in the past. 0/0

Welcome, New Members

☺

Mort	Binstock	94
Arthur	Gindin	94

		Expires
Daniel	Chattin	8/94
Fred	Henn	7/94
Jeffrey	Kuhlmann	7/94
Lafe	McCorkle	9/94
Mike	Stephens	7/94

Trea$ury Note$

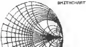
As of October 3, 1994 we have a balance of $481.20

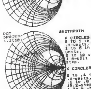
Abed Kahale Treasurer

Smith's Chart

by Edwin N Phillips

The Smith's Chart is used in microwave applications. The program draws the elliptical chart and then plots the real and imaginary roots of the INPUTed values.





```
   0>REM (©1993)EDWIN N. PHILLIP
S
  50 REM "SMITHCHART"
  60 PRINT TAB 08,"SMITHCHART"
  70 PLOT 0,87
  80 DRAW 174,0
 100 REM "RCIRCLES"
 110 FOR R=0 TO 1 STEP .1
 120 GO SUB 300
 130 NEXT R
 140 FOR R=1 TO 5 STEP 1
 150 GO SUB 300
 160 NEXT R
 170 FOR R=5 TO 10 STEP 5
 180 IF R=10 THEN GO TO 390
 190 GO SUB 300
 200 NEXT R
 300 LET AA=((2*R+1)*87)/(R+1)
 310 LET BB=87/(R+1)
 320 CIRCLE AA,87,BB
 330 RETURN
 390 REM "XCIRCLES"
 400 FOR X=.1 TO .3 STEP .1
 410 LET A=2*ATN X
 420 FOR B=.0002 TO A STEP .0002
 430 GO SUB 2000
 440 NEXT B
 450 NEXT X
 500 FOR X=.4 TO .8 STEP .2
 510 LET A=2*ATN X
 520 FOR B=.002 TO A STEP .002
 530 GO SUB 2000
 540 NEXT B
 550 NEXT X
 600 FOR X=1 TO 5 STEP 1
 610 LET A=2*ATN X
 620 FOR B=.005 TO A STEP .005
 630 GO SUB 2000
 640 NEXT B
 650 NEXT X
 700 FOR X=5 TO 10 STEP 5
 710 LET A=2*ATN X
 720 FOR B=.05 TO A STEP .05
 730 GO SUB 2000
 740 NEXT B
 750 NEXT X
 800 PRINT AT 20,0;"DATUM"
 810 PRINT AT 21,0;"REAL?"
 820 INPUT R
 830 PRINT AT 20,0;"DATUM"
 840 PRINT AT 21,0;"IMAG.?"
 850 INPUT X
 860 LET G=87+(((R*R)+(X*X)-1)/(
(R+1)*(R+1))+(X*X)))*87
 870 LET H=87+((2*X)/(((R+1)*(R+
1))+(X*X)))*87
 880 PLOT G,H
 890 GO SUB 3000
 900 PRINT AT 20,0;"MORE?"
 910 PRINT AT 21,0;"(Y/N)"
 920 INPUT A$
 930 IF A$="Y" THEN GO TO 950
 940 IF A$="N" THEN GO TO 1090
 950 PRINT AT 20,0;"DATUM"
 960 PRINT AT 21,0;"REAL?"
 970 INPUT R
 980 PRINT AT 20,0;"DATUM"
 990 PRINT AT 21,0;"IMAG.?"
1000 INPUT X
1010 LET I=87+(((R*R)+(X*X)-1)/(
(R+1)*(R+1))+(X*X)))*87
1020 LET J=87+((2*X)/(((R+1)*(R+
1))+(X*X)))*87
1023 LET M=I-G
1025 LET N=J-H
1030 DRAW M,N
1040 GO SUB 3000
1043 LET G=I
1046 LET H=J
1050 PRINT AT 20,0;"MORE?"
1060 PRINT AT 21,0;"(Y/N)"
1070 INPUT B$
1080 IF B$="Y" THEN GO TO 950
1090 IF B$="N" THEN PRINT AT 20,
0;"STOP"
1100 IF B$="N" THEN STOP
1110 STOP
1500 PRINT
1510 PRINT TAB 22;"R CIRCLES"
1520 PRINT TAB 22;"0 TO 1 in"
1530 PRINT TAB 22;".10-units,"
1540 PRINT TAB 22;"1 to 5 in"
1550 PRINT TAB 22;"units,"
1560 PRINT TAB 22;"5 to 10 in"
1570 PRINT TAB 22;"1 5-unit"
1580 PRINT TAB 22;"step."
1590 PRINT
1600 PRINT TAB 22;"X CIRCLES."
1610 PRINT
1620 PRINT TAB 22;"0 to .4 in"
1630 PRINT TAB 22;".1-units,"
1640 PRINT TAB 22;".6 to .8"
1650 PRINT TAB 22;"in.2-steps"
1660 PRINT TAB 22;"1 to 5 in"
1670 PRINT TAB 22;"units,"
1680 PRINT TAB 22;"5 to 10 in"
1690 PRINT TAB 22;"1 5-unit"
1700 PRINT TAB 22;"step."
1710 RETURN
2000 PLOT 174-(87*SIN B)/X,87*(1
-(1-COS B)/X)
2010 PLOT 174-(87*SIN B)/X,87*(1
+(1-COS B)/X)
2020 RETURN
3000 DRAW 0,4
3010 DRAW 0,-8
3020 DRAW 0,4
3030 DRAW 4,0
3040 DRAW -8,0
3050 DRAW 4,0
3060 RETURN
```

COMPUTUS INTERRUPTUS

by Wes Brzozowski

Originally published in SINCUS NEWS, we are bringing you this series with the permission of the author

"All right", comes the chorus, "what's an Interrupt and why should I care?" I'll admit, it's possible to lead a normal happy life even if you've never heard of an interrupt. But in that case, you'll have missed something that's at least lots of fun and at most very useful.

This series of articles will try to give something to everyone. Those who despise technical details will be able to pick out some programs that can be entered and immediately used, to give new power to their computers. Beginning machine code programmers will learn of a hidden **bug** in the system that can do weird things to their software. Advanced machine code programmers will find a versatile tool that will allow them to do things they may not have suspected possible. Those who like to build hardware will also find a few interesting tricks. By the end of this first article, we'll understand what interrupts are and have a small program that demonstrates **interrupts** in action and which may be of use once incorporated into a BASIC program. We'll build on this demonstrator program in the future. In order to accommodate the many levels of experience of various members, this article is laid out in topics. Each starts with simple explanations and progresses into technical detail. If you find yourself in **too deep**, the water becomes shallow again at the start of the next topic!

1 What is an Interrupt?

Perhaps an analogy would be the best way to begin. Suppose while you are reading this article, the telephone rings. You'll probably set the newsletter down, mentally remembering where you were and go answer the phone. When you're done you'll come back and resume where you left off. You've just **serviced an interrupt**. Let's try another analogy. Suppose you find my articles so interesting that you absolutely can't be disturbed while reading them. Because of this, you unplug your phone before you start reading and plug it back when you're done. If the world outside tries to interrupt you, you won't know and won't respond. During that time, you've **disabled the interrupt**. Now for one more analogy. Your neighbor knows you have a habit of unplugging your phone so he comes to your house and rings your doorbell. He can see you through the window so you can't ignore him. You set down the newsletter and open the door. You are servicing a **Non-Maskable Interrupt (NMI)**

The TS-2068 has both maskable and non-maskable interrupts activated by pulling one of two pins on the expansion connector to ground. When this happens the present value of the program counter goes on the stack, and the machine starts executing at some new location, where the **interrupt handler** software is. If it will make it easier to picture, it acts as though a CALL (machine code, but very much like a GOSUB) instruction has been added right where the computer happens to be running code. In fact, the interrupt handler is written as a subroutine that actually can be CALLed. Exactly where in memory the interrupt handler may be located will be dealt with later.

The TS-2068 generates its own maskable interrupt every 1/60 second. This causes the keyboard to be scanned and the 3 byte system variable FRAMES to be increased by one count. This variable can be used as a clock or timer and, in fact is what the PAUSE instruction uses to determine whether it has waited long enough. (Have you noticed that the number that follows PAUSE is a count, also in sixtieths a second?) This 60 Hertz interrupt is also synchronized to the beginning of each video frame on your TV or monitor, which can be useful. It's not hard to divert this interrupt so it can do some work for us on top of its normal duties. We'll demonstrate this in a moment.

2 Can't an interrupt disrupt a program that is running?

Absolutely. One place where our phone answering analogy breaks down is in the fact that you remember having answered the phone, but the routine being interrupted has no knowledge that it's been temporarily set aside. This means that the interrupt handler software has to be carefully written so as not to change anything unexpectedly. For example the first thing usually done is to PUSH all registers onto the stack. The last thing it does is to POP them all back

M1	Code FETCH cycle operation	MI	Maskable Interrupt
M3	Memory WRITE cycle	M2	Memory READ cycle
NMI	Non-Maskable Interrupt	WR	WRITE
RAM	Random Access Memory	RD	READ
ROM	Read Only Memory	R/W	READ/WRITE
IORQ	Input/Output Request	EI	Enable Instruction
AROS	Application ROM-Oriented Software	DI	Disable Instruction
LROS	Language ROM Oriented Software	JP	Jump
EPROM	Electrically Programmable Read Only Memory	JR	Jump Relative
EEPROM	Electrically Erasable Prog. Read Only Memory	Z	Zero
EMU	Emulator	NZ	Non Zero
000H(000)	Hexadecimal (decimal)		

into place before it Returns to the program that was interrupted Therefore, even though the interrupt handler may have temporarily changed the registers it leaves them exactly as it found them

3 What about programs where the exact time required to execute a loop is critical? Won't an interrupt change that timing?

Yes it would In such circumstances an interrupt could be disastrous When such things are expected (LOADing, SAVEing BEEPing, LPRINTing are all examples) the maskable interrupt is disabled with the DI machine code instruction The non-maskable interrupt cannot be disabled, and could be quite disruptive if misused It is normally not used with the TS-2068 and a ROM bug generated by Sinclair and faithfully copied by TIMEX, makes it nearly impossible to use any way Next time, we'll investigate some hardware methods that get around this bug

The following experiments show how things can go when unexpected interrupts appear or when necessary interrupts fail to materialize I've mentioned that the TS-2068 generates its own maskable interrupt (from now on, we'll just call it the **interrupt**) every sixtieth of a second This can be turned off in hardware by setting bit 6 or I/O port FFH (255) It's not quite the same as executing a DI, but it has the same effect, and can be done from BASIC

TYPE IN

```
10 OUT 255,64
20 PAUSE 5
```

If you RUN 20, the program runs in a flash, PAUSE 5 doesn't take very Long after all However, if you just RUN, the computer is locked up until you shut off the machine Line 10 shut off the interrupts (The analogy now is not so much like unplugging your phone as it is shutting down the phone company! Fortunately, recent actions by the US Justice Department have prevented the analogy from seeming overly bizarre.) Remember the systems variable FRAMES is incremented every time an interrupt occurs PAUSE 5 waits for it to get incremented 5 times Unfortunately with no interrupts, FRAMES doesn't change and the computer sets out to prove that it's more patient than its owner!

For the case where we don't want interrupts those who own a TS-2040 PRINTER may type in the following

```
10  PRINT AT 10,10; "WES"
20  RANDOMIZE USR 2562
30  STOP
40  PRINT AT 10 10; "WES"
50  RANDOMIZE USR 2563
```

The ROM routine at 2563 contains the COPY command If you RUN this you'll get a piece of paper with my name on it However the TS-2040 printer is controlled by a precisely timed set of pulses An interrupt would cause some of these pulses to be lost For this reason the first instruction in the COPY command is DI which disables the interrupt. If we instead RUN 40 we will have skipped around the DI instruction and the print sequence is disrupted 60 times a second by unwanted interrupts This times my name comes out as a meaningless blur I liked the first way better!

The moral to machine code programmers is, no matter how tight the little loops in your programs the computer is sneaking in 60 times a second unless you DI first. Do that DI before entering any critical timing loops and restore things later with EI Don't forget that the keyboard won't be scanned and FRAMES won't be updated while your DI is active

4 Where does the interrupt handler have to be placed in memory? Can I put it where I want it, or add my own handler?

You have a Little control, in some cases The non-maskable interrupt always starts at location 0066H In the TS-2068 this is in the ROM I mentioned a bug there that keeps us from normally using this feature We'll discuss this next time along with a different hardware method to correct the **bad byte** using the TIMEX ROM

The maskable interrupt operates in 3 software selectable modes MODE 0 causes the interrupt to start executing at a location defined solely by external hardware We won't use it here but it is mentioned for completeness. MODE 1 causes the interrupt to start executing at location 0038H This is how the TS-2068 normally operates, and the interrupt handler is located there The TS-2068 Technical manual Section 5 3 1 suggests a totally worthless method of intercepting the MODE 1 interrupt; I consider it worthless because it can't be used along with BASIC Let's be greedy and demand it all Once again we can use the AROS/LROS Board with a change to the interrupt handler, but this still requires one to build the board let's demand a software only BASIC comparable technique It turns out that one exists!

Our ability to easily use the interrupt lies in interrupt MODE 2. In it the most significant byte of an address is kept in the Z-80's "I" register The least significant byte is read from the data bus IMPORTANT users of Spectrum Emulators should note that Real Spectrums put a different value on the data bus FFH (255) than do TS-2068's (I've detected 0F, 2F, 3F and 0E so far, with evidence that there may be others), For this reason certain Spectrum software that uses interrupt MODE 2 won't work on a TS-2068 even with an emulator It appears that putting pull-up resistors in the data bus fixes this problem (Only bit 2 already has a pull-up resistor probably used by code at location 0BFFH (3071) in the EXROM for detecting whether additional memory expansion banks are present. This will be the subject of another article but it's worth pointing out here to explain why only 7 not 8, resistors are needed to enhance Spectrum emulators)

In the spirit of true greediness, wanting our own interrupt handler to work even without pull-up resistors we will want to tolerate any value on the data bus We even want to tolerate variable values on the data bus Fortunately there's a renegade Spectrum add-on joystick that does just such a thing during interrupts This is fortunate for us because it caused our British friends to solve the problem for us

One thing I haven't mentioned is that the address assembled from the "I" register and the data bus is NOT the address of the interrupt handler! It is the ADDRESS OF THE ADDRESS of the interrupt handler Although this makes it a bit more difficult to understand MODE 2, it lets us put the handler wherever we want; we can even change it easily while a program is running In designing our interrupt code, we'll borrow rather heavily from the solution proposed by Tom Webb in Advanced Spectrum Machine Languages Melbourne House If we put FEH (254) in the "I" register but don't know what will appear on the data bus the machine will get the address of the interrupt handler from somewhere between locations FE00H (6524) and FF00H (65280) If we fill this 257 byte block with FDH's (253), then the address of the interrupt handler will always be FDH FDH! This is 3 bytes before the block of FD's, and is just long enough for a JP instruction to the real interrupt handler Doing this, our software only fix for the hardware problem takes up only 260 bytes of memory, and it's all in one continuous block! We have 255 bytes of memory available above the FD block and it would be most convenient to locate our interrupt handler there We'll end the handler with a JP to the ROM interrupt handler so that the keyboard will still be scanned as usual (Being lazy as well as greedy we'd rather not do that ourselves!)

5 Can we do something useful with this handler?

There's nothing wrong with being practical, so why not? There are a number of Spectrum programs that use MODE 2 to actually add new commands to BASIC The following program will give a much simpler, but distinctly related example by adding a new function to the TS-2068 As long as the interrupt is enabled, you can immediately COPY the screen to the printer by simultaneously pressing SYMBOL SHIFT and BREAK. This can even be done while a program is running, and even in the middle of a PRINT statement. When the copy is done the program will continue, completely oblivious to the fact that it's been interrupted The printout will include the edit line

```
  10 REM IM2 Demonstration Progr
am
  20 REM Causes a Copy-Screen Wh
enBREAK and SYMBOL-SHIFT are pre
ssed together.
  30 CLEAR 65020
  40 FOR j=65024 TO 65280: POKE
j,253: NEXT j
  50 POKE 65021,195: POKE 65022,
8: POKE 65023,255
  60 FOR j=65281 TO 65314: READ
k: POKE j,k: NEXT j
  70 DATA 62,254,237,71,237,94,2
01,245,197,213,229,62,127,219,25
4,246,224,254,252,32,6,243,6,192
,205,5,10,225,209,193,241,195,56
,0
  80 RANDOMIZE USR 65281
```

Certain BASIC commands disable the interrupt. During such intervals, this copy-screen function won't work. These commands are (LOAD, SAVE VERIFY, MERGE, COPY LLIST LPRINT and BEEP) Some commercial machine code programs also disable the interrupt. Add the following to your own BASIC program (exact line numbers aren't important, as long as you get the lines in the right order) Make sure your program executes it once, more times won't hurt, but they won't help, and take a few seconds to run Once this is done the copy-screen command is active and will remain so even if you STOP the program and LOAD in a new one

The NEW command shuts off the interrupt mode, but leaves the code intact, so that it can be reactivated with only the RANDOMIZE USR 65281

We'll save a discussion of the program for next time, and we'll discuss the problems of relocating it, and how to modify it to print only part of the screen Until then, you might get some enligntenment amusement / frustration by taking it apart, to see how it works The correct answer will be printed here next time!

Batteries For Z88

by Don Lambert

Richard Jelen mentioned this topic and I finally saw the displays in a store The batteries are RAYOVAC RENEWAL REUSABLE ALKALINE While it has been mentioned that life can be more than 25 recharges even at twenty five it is quite a savings if you use a lot of batteries Off hand I don't know how many batteries that a Z88 requires but I suspect 4 AA cells And with that as an example and needing two sets of alkaline batteries so that you can be using one set while the other set has been recharged and is waiting for use let us take a look at how much difference there is in prices The regular alkaline are 8/$4 79 and for 50 sets of batteries it would cost 25 X $4 79 or $119 75 But with rechargeable alkaline batteries the charger is $19 00 plus the batteries are 4/5 97 so a set for fifty uses of batteries is $30 94 or just a shade over one fourth the cost of none rechargeable batteries The rechargeable batteries have a shelf life of 5 years whether new or recharged. The literature compares the rechargeable with Ni-Cad which according to the literature loose 1% of their power each day while waiting for use. I was surprised that they did not compare the costs of the rechargeable to that of the regular alkaline which is what I did. I believe that any battery appliance used should be considered as a prime user of the rechargeable alkaline batteries. They are available in AAA, AA, C and D cells but not the 9 volt battery. The charger listed above is only for the AAA and the AA cells. The one that will charge all the rechargeable alkaline batteries is, I think, about $30 00. Of course the cost of the larger batteries goes up. Another factor is that there is not the dangers to environment since the rechargeable do not have cadmium in then and starting next year no mercury. Currently they are 99 975% free of mercury. The AAA and the AA batteries charge in 3 to 5 hours and the others charge overnight.

I called their 800 number and got some further information in that the batteries survive best if they are not fully discharged before recharging. Unlike Ni-Cads they work best if they are recharged often. As far as output, the information that I got was on a D cell and I was quoted 5 5 amp-hours but not at what load on the battery. But if the D cell was continually fully discharged then at the end of 25 cycles the amp-hours would drop to 2.2. But I was told that the batteries were not like Ni-Cad or regular alkaline and were different in use.

I suppose like when Ni-Cad were first used it would take an awareness of the difference to get the most life out of them. But money wise replacing either with rechargeable alkaline batteries is much cheaper.

According to the literature that I received short depth of discharge cycles will yield over 100 cycles of use. But each time they are used the useful capacity of the battery will lessen. In deep discharge of the batteries will result in after 25 cycles a battery that will end up with a capacity of a Ni-Cad.

The special charger samples the batteries voltage and then gives the battery a jolt of charge and then samples the voltage and does that 120 times a second until the battery voltage is at 1 65 volts. Then if the battery is fully charged it does not damage the battery to leave it on the charger continuously if not in use. Once charged the battery does not get more charge unless it is less than the set voltage and then it might get one surge of charge a day or less. Each battery in the charger is charged separately so that any can be put in at any time. A light indicates when a battery is fully charged.

Looking at the specs for AA size it shows a load of 3 9 ohms (flashlight) drawing 308 MA at 1 2V and a battery decline to 1 0V in 3 9 hours in continuous duty. 0/0

Adjust DATASPACE Please

by Al Feng

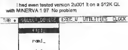
So, I was reading through the March/April NITE-TIMES NEWS and there was a comment that John Donaldson had brought a beta-version of the new **QLAMBer** program to the March meeting, but, it had received an "unfavorable review" from John according to Larry Sauter "because of a bug caused by incorrect operating system compatibility." HMMMmmm. Just when you think it's safe to go into the water -- GLUG (or, should I say "GULAG"?!?)

I thought, "Okay. It was an early version (I don't remember what version of the program he received, though I'm pretty sure I had indicated that it was a "beta-version" of the program) .. in fact, it might have been the prototype that did not yet access 'page 2'." I know some early, beta-versions did not recognize HD disks and one even had trouble with microdrives.

But, just what was the 'system incompatibility" that was described by Larry Sauter?

Having developed/compiled (TURBO 2 00) **QLAMBer** with a GOLD CARD and MINERVA 1 82, I figured it should be compatible with just about everything out there since MINERVA seems to get stricter and stricter as the version number gets higher.

I had even tested version 2u001 it on a 512K QL with MINERVA 1 97. No problem.



Then I tested version 2u001 with a plain Jane (JSU) QL with only 128K and a TK2_dongle on the back. Again no problem.

Then I ran the GOLD CARD with MINERVA 1 97 and C-R-A-S-H.

So much for compatibility with everything! Well back to the salt-mines!

Now I'm thinking "As far as I know this setup doesn't exist within CATUG, but, what happened with the GOLD CARD?"

Well, six hours later I finally concluded that the only resolution was to re-compile the program using a greater amount of OBJECT DATA that the program uses (grabs) The result is **QLAMBer**_min(erva) though some might think of it as **QLAMBer**_MAX(imus)!

QLAMBer_min allocates a whopping 64K of OBJECT DATASPACE to the program and is only necessary if you experience a program crash immediately after the program displays the files on the medium

If you are compiling with TURBO and are having difficulties with MINERVA 1 97 (or, higher?), then try re-compiling with a greater DATASPACE allocation It seemed to work in this one instance, it may help you

QLAMBer

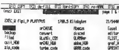
Out-of-town readers of the NITE-TIMES NEWS may be wondering what the **QLAMBer** program is that John Donaldson "demo (-nstrat/-lish)ed" at the March 19, 1993 CATUG meeting

QLAMBer is intended to be the successor program to QLUSTer, though new features such as sub-DIRectory access and removal have now been implemented in QLUSTer

QLAMBer — **QL**(utilities)_**A**_**M**(oving)_**B**(ox)/**e**(nhanced)**r**(elease) — operates much the same as **QLUSTer** except that a_moving_box now selects the file instead of a single_key

As with QLUSTer, six SuperTOOLKIT2 keywords are accessed [WCOPY, WDELete SPooL RENAME/WRENname, WSTATus] TK2_EXTensions (on most disk interfaces) are the only extra code needed to run the program

Because **QLAMBer** succeeds QLUSTer, the screen is similar A screen page is "shifted" (if applicable) by simply pressing a [shift] + [cursor] key combination if you have more than 76 files in a single directory then simply press the down arrow /[cursor_down] key in tandem with a [shift] key



```
[F1] COPY  [F2] de-FILE  [F3] Hard-COPY  [F4] re-NAME  [F5] pre-VIEW
(esc) EXIT                                           page 1 & 0+ files

EXEC_W flp1_@ PLATYPUS       1798.5 Kilobytes       21/1440 sectors

             arCHIVE        Abacus        Easel
backup       convert        disced        editor
flied        QLUMG_COM      QLAMBer       FLIST_lap
quit_HOB     arCHV_HOB      abba_HOB      graf_HOB
zip_code     turbo_code     QRAM_code     QPRINT_prt
printer_dat  10K.W5_dat     PR2300_dat    blank_doc
COMMAND_COM  S_KeyDef       QD10K ->
```

If you want to "page to flp2_ from flp1_ then simply press the right arrow key in tandem with a [shift] key

To "page' back to flp1_ from flp2_ then simply press the left arrow key in tandem with a [shift] key

Using the [ConTRoL] key with either the left or right arrow key will access a different type of device of like numerical value (that is from flp2_ to ram2_ mdv2_ to flp2_, mdv1_ to flp1_, ram1_ to flp1_ win1_ to flp1_, and, so on)

Sub-DIRectories are accessed when the [filename] selected is appended with the ' ->' suffix.

SELECT_DEVICE is used to RETurn to the main directory

Filenames longer than 32 characters are NOT recognized by the program

QLAMBer requires SuperTOOLKIT coding installed via ROM (or, RAM) prior to LOADing

QLAMBer easily multi-TASKs using either the QRAM environment or within TASKMASTER

QLAMBer is available as an "Issue Disk" from UPDATE!

HAPPY TRAILS,
AND COMPUTING, TO YOU .

THE INFORMATION SUPER HIGHWAY

COMMUNICATIONS - MODEMS 101

by Abed Kahale

Computers use binary codes of "ON" bit which has a value of 1 and "OFF" bit which has a value of 0 for sending information across short distances to serial peripherals such as serial printers and modems

Computers voltages from 5 to 15 volts for an "ON" bit and from -5 to -15 volts for an "Off" bit. But to send information over the telephone lines, computers need to modulate this digital information into analog format the telephones use, in other words convert it into variable pitch sound instead of beeps, then demodulate it at the other end so that the receiving computer can understand it. Hence, the device that does this takes its name from MOdulate DEModulate => MODEM

Modems communicate one bit at a time using serial transfer The standard serial transfer uses 9 wires of which only two wires actually transfer data, the rest manage the transfer process and provide signal ground, to prevent statics and interference

Your communication software's dial command transmits a signal ATDT (ATtention Dial Tone) followed by a phone number to your modem which goes off hook - *picks-up the phone so to speak* - and dials out using DTMF (tone) as opposed to pulse dialing in this case, When the modem on the other end receives a ring, it sends a signal RI (Ring Indicator) to the software telling it to issue a command to pick up the phone When the remote modem picks up the phone, your modem sends out a hailing tone, and the remote modem responds with a higher pitch tone The modems then exchange information (cackle) about how to transfer data in a *handshake*, rate (BAUD - bits per second), type of transfer (ASCII, x-modem etc) and settings (8N1) to determine the size of data packets the systems will exchange Hence the word *protocol* is used to describe this exchange

Once the communications are established the modems send a DCD (Data Carrier Detect) signal, which continues until the modems either hang up or get cut-off.

A data packet is a group of bits that constitutes a single character The 8 in the setting 8N1 refers to the number of data bits in the packet. Each packet is enclosed by a Start bit and a Stop bit that tells the receiving modem where the packet begins and ends The 1 refers to the number of stop bits in the packet

Data packets sometimes contain a special parity bit that the modem use for basic error checking Parity can be set to Odd, Even or None When parity is Even the transmitting system sums up the 0s and 1s and gives the parity bit a value of 1 or 0, whichever makes the total an even number If the receiving modem gets a different result, it assumes that the transmitted data is incorrect and requests a re-transmit from the other modem

When a communications session is over, each of the computer's software sends an ATH (ATtention Hang) command to its modem instructing it to go on-hook, hang-up Or when the other modem loses the data signal carrier (DCD) it also hangs up

DTR ↔ Data Terminal Ready
DCD ↔ Data Carrier Detect
DSR ↔ Data Set Ready
ATA ↔ ATtention Answer
ATO ↔ ATtention (go) On-line

Complex ASCII Rotation

Tim Swenson — QL Hacker's Journal

Having been a Unix system administrator, I know how mail can bounce and be sent to the "Postmaster" for resolution. As "Postmaster" I read other persons mail to figure out where it was supposed to go I like to tell people that e-mail is about as private as a post card. You don't write very private stuff on a post card, so don't do it with e-mail.

Another general rule of e-mail is not to write anything in a mail message that you would not like to see on the front page of your local newspaper

I got to thinking about using encryption for e-mail (encryption is a hot topic these days) But, I did not want to go the extremes of using Public-Key encryption or DES Since the whole idea is to make your mail unreadable to the general perusal, a fairly simple algorithm would work. I also wanted something that could be very easy to port and was not dependent on any computer platform So, the whole scheme had to rely heavily on the password the user uses

OK now to the details What this program does is more than just simple rotation of the characters Simple rotation is just adding a constant number to all characters If you rotated by 2, A becomes C, B becomes D, etc Way too simple So to mix it up, a rotation array is made out of the password. For each letter of the password, a MOD 7 is done and the results put into the array The longer the password the longer the array You could make the program do simple rotation with a one character password.

Once the array is created, the program goes through the input file, using the rotation array to rotate a number of characters The program will cycle through the rotation array many times (like a circular queue) until it reaches the end of the input file The output file has the general look of the input file (newlines are not touched), but the words are now meaningless

This encryption is not unbreakable, but to 99% of the population it is unreadable Someone would have to be pretty determined to try to unencrypt it.

Since this was a fairly simple program to write, I wrote a version in SuperBasic and C When I get my FORTRAN compiler up and running, I'll try to port it to FORTRAN Then I'll try Pascal to try out Computer One Pascal

```
100 OPEN #3,con_250x150a50x50
110 PAPER #3,0 : INK #3,4 : BORDER #3,4
CLS #3
120 INPUT #3,"Name of Input File :
";in_file$
130 INPUT #3,"Name of Output File :
";out_file$
140 INPUT #3,"Password : ";password$
150 INPUT #3,"Rotate or Unrotate (U/R)
";rot$
160 IF rot$="r" THEN rot$="R"
170 IF rot$="u" THEN rot$="U"
```

```
180 IF rot$<>"U" AND rot$<>"R" THEN GO TO
150
190 DIM rot(30)
200 REMark Create Rotation Array
210 pass_len = LEN(password$)
220 FOR x = 1 TO pass_len
230    rot(x) = CODE(password$(x)) MOD 7
240 NEXT x
250 OPEN_IN #4,in_file$
260 OPEN_NEW #5,out_file$
270 ror_mark = 1
280 REPeat loop
290 IF NOT EOF(#4) THEN
300    in$ = INKEY$(#4,-1)
310   ELSE
320    EXIT loop
330 END IF
340       IF CODE(in$) < 32 THEN
350          PRINT #5,in$;
360       ELSE
370          LET temp = CODE(in$)
380          IF rot$="R" THEN temp =
temp+rot(rot_mark)
390          IF rot$="U" THEN temp = temp-
ror(rot_mark)
400          PRINT #5,CHR$(temp);
410       END IF
420       rot_mark = rot_mark + 1
430       IF rot_mark > pass_len THEN
rot_mark = 1
440  END REPeat loop
450 CLOSE #4 : CLOSE #5
460 PRINT #3,"  Done "
470 CLOSE #3
```

Complex ASCII Rotation

This program takes as input a password and an ASCII file. From the password a rotation queue is derived. Then the incoming file is processed using the rotation queue to rotate each character differently then those to its left and right. The end result is an output file with the rotated text. The program also reverses the process and will produce the original text out of the rotated file.

```
*/
#define  ROTATE     1
#define  UNROTATE   0

#include <stdio_h>
/*  Global Array for holding Rotation
Queue */
int rot_array(30);
main ()
{
   int c, i, fd1, fd2, rot_mark, pass_len,
      rot;
      char *password,

   printf("Enter the Input File : ");

      fd1 = open_file("r");
   printf("Enter the Output File . ");

      fd2 = open_file("w"),

   printf("Enter a Password : ")
      gets(password);
      pass_len = strlen(password);
/* generate the rotation array from the
password */
   for ( i=1; i<=pass_len; i++)
      rot_array[i] = password(i) % 7;
printf("Rotate or Unrotate (U/R) : "),
   c = getchar();
   putchar(c),
   printf("\n");
   if ( c == 'R' || c == 'r' )
      rot = ROTATE;
   else
      rot = UNROTATE;

/* Start of the main part of the program
*/
   rot_mark = 1;
while (( c=getc(fd1)) != EOF)
   {
      if ( !isprint(c) )
         putc(c,fd2);
      else {
         if ( rot == ROTATE )
            c = c + rot_array(rot_mark);
         else
            c = c - rot_array(ror_mark);
         putc(c,fd1),
         rot_mark++;
         if ( rot_mark > pass_len )
            rot_mark = 1;
      }
   }
   printf("\n     Done!\n\n");
}
/*  This procedure gets a file name and
opens it. if it fails, it aborts the
program. It takes three values "r", "w",
"a"  for Read, Write, Append
  Usage:   file_pointer = open_file("r");
 */
open_file(rwa)
  char *rwa;
{
char filename[30];
   int  fd;
gets(filename);
   fd = fopen(filename, rwa);
   if ( fd == NULL) {
      printf("\n  Error Opening File!
\n");
      abort(-1).
   }
return fd;
}
```

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Broken LINK

From the editor

The folding of the SINC-LINK, the end of the Best of the Best Sinclair newsletter era, leaves a large gap in the Sinclair community. For more than twelve years, SINC-LINK provided us with top-notch articles and programs on all of the Sinclair computers — very thorough with help available on what ails you.

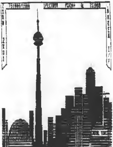
George Chambers, Hugh Howie and Jeff Taylor were the nucleus of the Newsletter. George, the most prolific, Bob Mitchell, Larry Crawford, Hugh Howie and very many more.

As George puts it; *"We have become long in the tooth and, at least for my part, I want to move onto other things "*— a state-of-the-art 486. He will still be available for advice on problems we may encounter: *"I shall be maintaining my TS-2068 computer system for some time to come."*

I can appreciate how publishing a newsletter can become a chore after so many years especially when articles become scarce. Although I enjoy working on the Newsletter, I do spend some 40 hours, learning Desk Top Publishing, editing, spell-checking, formatting, printing and so on, and then some, for affixing labels, stuffing envelopes, stamps etc.

"Any of you into MSDOS?"
George, you've probably discovered that MSDOS is still archaic by Sinclair standards although it seems that the end is near for it after Chicago (Windows 95) takes over in 95. It is clunky and not user friendly with limitations and intimidation, no true multitasking a la QL. Windows software, canned programs I don't dare disturb, have improved greatly to being more intuative and user friendly in the last 12 months, the learning curve became very short for the initiated but with a penalty of more memory requirements both for RAM (8 Megs) and disk space. It is too early to go into Multimedia unless you know your DMA's, IRQ's and I/O addresses. If you are finicky like myself, you would still like to write your own TS-2068 programs and have them run just the way you like, unless you are going into Visual BASIC or C++ programming. Good luck, bon chance to all.

We'll miss that LINK



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Z-SIO RS-232 Serial Interface

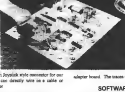
The Purpose of this article is to show how to convert, with the addition of few inexpensive components, a WC-2050 (TS-2050) modem board into a general purpose RS-232 serial interface You can attain, with the appropriate modem and software, speeds up to but not exceeding 9600 BAUD for less than $40 LarKen MaxCom provides the software for 1200 BAUD and Figure 6 provides the elements for software that you can write You can still find some of these surplus boards, (try RMG and Mechanical Affinity or check the FOR SALE ads in this issue) or, convert that extra modem that you might have. This is not a beginner's project. *Editor*

BLOCK DIAGRAM

Figure 2 shows a block diagram of the modem board. The address decoding, crystal oscillator, frequency divider and 8251 serial I/O, and power supply portions provide nearly all we need for an RS-232 interface As a complete modem, the input and output serial data available at the points marked A and B, would be connected to the modem's analog circuitry and translated between tone frequencies and voltage levels. For an RS-232 interface we need to redirect these signals to DC voltage level translators.

RS-232 PARTS

Next take a look at Figure 3 It shows a schematic of the recommended RS-232 adapter circuit. The parts list is contained in Figure 4. Notice that there are only three IC's. An MC1889 Line Receiver is used to buffer the incoming signals; an MC1888 Line Driver is used to buffer the outgoing signals, and an Intersil ICL7662 switching regulator is used to develop the required negative supply voltage from the modem's +9 Volt supply In our prototype we used a 9-Pin Male Atari Joystick style connector for our RS-232 output, but you can directly wire in a cable or another choice of connector



INSTALLATION PROCEDURE

Before installing the RS-232 adapter board, be sure you have a working modem board in front of you It is not important that the modem's analog section be working as long as the digital portion of the board is working Of course if the entire modem does work, the digital portion will work.

NOTE: There is a wiring error on some of the surplus boards, 74C00 pin 11, should be connected to MC14412 pin 12 while 74C00 pin 12, should be connected to the 8251 pin 23 These connections are reversed on some of the surplus boards

Build up the circuit shown in figure 3 The parts are easy to find. A small PCB card such as the ones available from radio shack will do fine

CONSTRUCTION HINTS

The RS-232 adapter board requires 9 signals from the modem board

OUTPUT SIGNALS:- RTS TX, DTR
INPUT SIGNALS:- RX, CTS, DSR
POWER SIGNALS:- GROUND, +5 Volts, +9 Volts

Eight of these signals are available at the pins of the 8251 serial I/O chip The only signal not present on the chip is the +9 volt power, which can be picked up on one side of the modem's DATA Light Emitting Diode (LED). Our prototype board (shows in Figure 1), takes advantage of this and uses a pin-and-socket arrangement to make the 8 connections at the IC First a 28-pin IC socket is soldered right on top of the 8251 Then pins are soldered onto the RS-232 PC Board so that the board can plug in, right on top of the IC The ninth signal required is made by attaching a single wire between the RS-232 board and the +9 Volt power where the LED is. The positive side of this LED is the lead closest to the corner of the modem board.

TRACE CUTS

You must make three trace cuts on the modem PC board. This is to disconnect the three modem input-signals that go from the modem's analog section to the 8251 chip These signals are replaced with those coming from your RS-232 adapter board. The traces to be cut are shown in Figure 5

SOFTWARE & TESTING

To test out your RS-232 by itself you can do a simple wrap around test by temporarily connecting CTS to RTS, and TX to RX. The software driver for the modem is shown in figure 6 Under this test arrangement, whatever you send out will be wrapped around and received back.

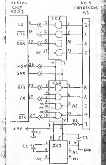


FIGURE 3 RS-232 ADAPTOR SCHEMATIC

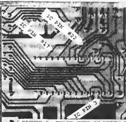


FIGURE 5. TRACE CUTS ON MODEM BOARD

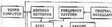


FIGURE 2 MODEM BLOCK DIAGRAM

FIGURE 4. WC2050 TO RS232 PARTS LIST

IC1	MC1489 QUAD LINE RECEIVER
IC2	MC1488 QUAD LINE DRIVER
J1,J2	WIRE JUMPERS, 0.3 INCH
J3	WIRE JUMPER, 4.5 INCH
A1	CONNECTOR, DB-9 MALE "JOYSTICK TYPE"
A2	DUAL ROW WIRE-WRAP HEADER PINS
R1	RESISTOR, 1K 1/4W
PCB9 C	PRINTED CIRCUIT BOARD
C3	0.1UF 25V CER. DISC. (SUPPLY BYPASS)
	· POWER SECTION · VERSION ONE
IC3	INTERSIL ICL7662 POWER CONVERTER IC
C1	10UF 16V ALUM. ELECTROLYTIC (CHARGE PUMP)
C2	10UF 16V ALUM. ELECTROLYTIC (OUTPUT)
	POWER SECTION · VERSION TWO
A3	2.5MM OR 3.5MM JACK (NEGATIVE POWER)
X1	AC POWER ADAPTOR

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FIGURE 6. Sample TS2068 BASIC driver
for wrap around test at 1200 BAUD.
Change 78 in line 14 to 79 for 300 baud.

```
  10 OUT 119,0   REM send Zero to
                 clear UART chip
  11 OUT 119,0
  12 OUT 119,0
  13 OUT 119,64   REM UART reset
  14 OUT 119,78   REM 1200b,8 bit
                  NO parity
  15 OUT 119,55  REM Enable Xmit
                 and Receive
  20 REM Each byte sent OUT 115
     Will arive on the Transmit
     line of the RS-232 port.
  25 REM Example
  30 PRINT 'This is a test.
  40 LPRINT 'This is a test.'
  50 LET a$='This is a test.'  G
O SUB 1000
  60 PRINT  End of TEST.
  70 LPRINT  End of TEST.'
  80 LET a$= End of TEST.    GO S
UB 1000
  90 STOP
1000 LET i=LEN a$  IF i=0 THEN G
O TO 1050
1010 FOR x=1 TO i
1020 OUT 115,CODE a$(x)  PAUSE 4
1030 PRINT CHR$ IN 115,
1040 NEXT x
1050 RETURN
```

To PRINT? or not to LPRINT? — That is the Question

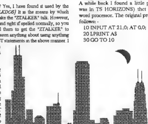
by the late Jim Brezina

Each new book I have bought on the TS2068 has taught me quite a bit about programming on the computer The things I have learned lately about the keyword PRINT are quite interesting.

The latest book I purchased, "Introduction to 2068 Machine Language" by Dr Lloyd Dreger, explained quite a bit about it. Many times I have entered programs with the command "PRINT#0," or the command "PRINT #1;" I found that the command would cause whatever followed it (a string or numbers) to be printed to the bottom two lines on the screen. However, in order for that information to remain on the screen, one has to provide some means to prevent an error statement or INPUT from appearing there. That can be done by a PAUSE or by following it with along FOR - NEXT loop All the PRINT # commands are to be followed by a semicolon. Dr Dreger's book informs me that "PRINT #2," will PRINT to the upper screen which is the same thing that PRINT also does The next PRINT command "PRINT #3," will send the printing to the printer This will be either the 2040 printer or a full size printer as long as you have the printer driver LOADed and initialized.

Is there a PRINT #4? Yes, I have found it used by the "ZTALKER" *[and LKDOS]* It is the means by which words are entered to make the "ZTALKER" talk. However, some words do not sound right if spelled normally, so you might have to misspell them to get the "ZTALKER" to sound right. I have not seen anything about using anything above #4 in these PRINT statements in the above manner I have seen them used in another manner which I will explain later on.

An interesting thing about this PRINT #3 setup is that, you can also enter LIST #3 and it will LIST to the printer Another thing you can do is with the LPRINT and LLIST commands LPRINT#2 and LLIST #2 will go to the screen instead of the printer



A number of years ago, I saw an article on one of the uses of the OPEN # command. This was originally intended for use with disks, however, it can also be used for printing without a disk system The manner in which it was used was to enter "OPEN #2" The TS2068 will not let you enter "OPEN #2" alone but it will let you enter "CLOSE #2" by itself To enter "OPEN #2" you must follow it with a comma (the comma is the only punctuation mark that works) and one of the following letters in quotation marks "S" for the upper part of the screen "K" for the lower part of the screen (with something like PAUSE to keep the PRINT on the screen) "P" for printing to the printer This will cause anything in a PRINT statement to go to where the letter indicates.

The most useful way of ENTERing this command is, "OPEN #2,"P" After ENTERing this command, whether in immediate mode or in a program, everything in the program that is in a PRINT statement will go to the printer

The simplest way of redirecting the PRINT to the screen is to enter "CLOSE #2" I have seen one article that said to enter "OPEN #2,"S", but, that to me is a waste of keystrokes and it still leaves the channel open.

I have found that the only channel that works that way is channel 2. You can use any one of the other 15 channels to send PRINT statements to the printer, but, you must follow them with the command "PRINT #(channel you are using)," followed by what you want printed. An example of this is as follows. -

```
10 OPEN #5."P"
20 PRINT #5; "Mary had a little lamb"
30 CLOSE #5
```

A while back I found a little program (I believe it was in TS HORIZONS) thet works like a simple word processor. The original program was written as follows: -

```
10 INPUT AT 21,0; AT 0,0;  LINE A$
20 LPRINT A$
30 GO TO 10
```

What happens with this program when you run it, is a cursor appears on the top of the screen. As you enter letters they are printed to the top of the screen and the cursor moves ahead of the letters The entered string does not have quotation marks Almost everything works as normal except the down arrow It is the BREAK key for this program. You can even use the CAPS LOCK for this program. You can enter graphics too When you key the ENTER key what is on the screen is printed to the printer. The screen would then be erased

Of course, a full sized printer will not PRINT the graphics You can also use the ENTER key for a Linefeed. For a full sized printer, you will have to have your printer driver LOADed in and initialized

I tried an alteration on the program by changing the 0,0 in line 10 to 1,0 Then I added a line 5 to PRINT the numbers through 0 all the way across the screen. I found that this line would remain on the screen at all times while the rest of the text would be erased with ENTER to PRINT to the printer I also found that corrections could be made to the text. I tried putting a semicolon after LPRINT A$, This had a drawback as one had to add spaces to fill the printers buffer or the entire text would not be printed out

In an old issue of Time Designs Magazine, one writer asked if there was a way to get the 2068 to PRINT direct to the printer without using a monitor Tim Woods answered that he knew of no way of doing this The next issue contained quite a few letters in answer to that question, but, none of them really gave an answer to do what the writer wanted. One of the answers gave me the following idea, but it still does not do what the writer wanted.

```
5 POKE 23692,2
10 LET A$ = INKEY$ PRINT A$,  LPRINT A$,
15 PAUSE 20
20 GO TO 5
```

The POKE 23692 2 makes the text on the screen scroll up when the screen fills instead of breaking out The semi-colons after the A$ keeps the printing on one line, otherwise, there would only be one letter to a line The PAUSE is necessary, as without it you would not be able to get your finger off a key fast enough so it wouldn't repeat. What happens is that the printer will PRINT out a line of text when the printer's buffer is full or you key ENTER.

This program has a number of disadvantages There is no cursor on the screen. You cannot delete screen letters with the 0 key You can move the unseen cursor with the arrow keys and correct words on the screen, but, you cannot change what is in the printer's buffer The result is that your mistakes will GOTO the printer You can still break out of the program with the CAPS SHIFT & BREAK keys CAPS LOCK cannot be used.

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